

## CLAIMS

1. An ion attachment mass spectrometry method in which positively charged metal ions are generated in a metal ion generation region attached to molecules of a measured gas in an attachment region to generate attached ions and then mass spectrometry of the attached ions is performed in a mass spectrometry region, wherein:

a pressure of said attachment region is set within a pressure range enabling free flight of said metal ions and said attached ions in said attachment region;

an electrostatic field is formed for decelerating said metal ions in said attachment region; and

only said measured gas and the positively charged metal ions are introduced to said attachment region.

2. The ion attachment mass spectrometry method as set forth in claim 1, wherein an upper limit of said pressure range relating to the pressure of the attachment region is 10 Pa.

3. The ion attachment mass spectrometry method as set forth in claim 1, wherein said metal ions traveling in said attachment region have a translational energy not exceeding 1 eV.

4. The ion attachment mass spectrometry method as set forth in claim 2, wherein said metal ions traveling in said attachment region have a translational energy not exceeding 1 eV.

5. The ion attachment mass spectrometry method as set forth in claim 1, wherein a partition is provided between said metal ion generation region and said

attachment region and the pressure of said metal ion generation region is lower than the pressure of said attachment region.

6. The ion attachment mass spectrometry method as set forth in claim 1, wherein said metal ion generation region and said mass spectrometry region are made in a common region vacuum environment.

7. The ion attachment mass spectrometry method as set forth in claim 6, wherein a path of travel of ions in said attachment region is formed as a curved path.

8. The ion attachment mass spectrometry method as set forth in claim 1, wherein all of said metal ion generation region, attachment region, and mass spectrometry region are evacuated by a single common vacuum pump.

9. The ion attachment mass spectrometry method as set forth in claim 1, wherein a mean free path of the free flight has a length of about 10 mm.